

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(32-41 LAI)	gp120(32-41)	KLWVTVYGVV <ul style="list-style-type: none"> <li>CTL from HLA-A2 positive subject react with this peptide; binds to HLA-A*0201</li> </ul>	MN rec gp160	human(A2)	[Dupuis et al.(1995)]
gp120(25-46 BRU)	gp120(33-54)	LWVTVYGVVWKEA- TTTLFCA <ul style="list-style-type: none"> <li>Defined through peptide blocking of CTL activity, and Env deletions</li> </ul>	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
gp120(env 48)	gp120(35-45)	VTVYGVVWVK <ul style="list-style-type: none"> <li>Study of the fine specificity of an A3-like-HLA-super-type epitope (the A3-super-type includes A*0301, A*1101, A*3101, A*3301, and A*6801)</li> <li>The A3 super-type is characterized a hydrophobic or hydroxyl containing anchor residue at position 2, and a positive charge in the C-term position</li> <li>While most lines were specific, a promiscuous cloned CTL line was derived from an HIV+ donor that could recognize this epitope presented by either A11 or A*6801</li> </ul>	HIV-1 infection	human(A11 and A*6801)	[Threlkeld et al.(1997)]
gp120(37-46 LAI)	gp120(36-45)	TVYGVVWVK <ul style="list-style-type: none"> <li>Multiple CTL clones obtained from two vaccinees</li> </ul>	gp160 vaccinia vaccine	human(A3.1)	[Johnson et al.(1994b)]
gp120(38-41 LAI)	gp120(36-45)	TVYGVVWVK <ul style="list-style-type: none"> <li>Highly conserved epitope recognized by multiple CTL clones from vaccinee</li> </ul>	gp160 vaccinia vaccine	human(A3.1)	[Johnson et al.(1994a)]
gp120(37-46 LAI)	gp120(36-45)	TVYGVVWVK <ul style="list-style-type: none"> <li>This peptide can be processed for HLA-A3.1 presentation in a TAP-1/2 independent pathway</li> </ul>	gp160 vaccinia vaccine	human(A3.1)	[Hammond et al.(1995)]
gp120(37-46 LAI)	gp120(36-45)	TVYGVVWVK <ul style="list-style-type: none"> <li>Identical twin hemophiliac brothers were both infected with the same batch of factor VIII</li> <li>One had a response to this epitope, the other did not</li> </ul>	HIV-1 infection	human(A3)	[Goulder et al.(1997a)]
gp120(42-51 PV22)	gp120(41-50)	VPVWKEATTT <ul style="list-style-type: none"> <li>P. Johnson, unpublished</li> </ul>	HIV-1 infection	human(B55)	[Brander & Walker(1995)]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(42-52 PV22)	gp120(41-51)	VPVWKEATTTL	HIV-1 infection	human(B35)	[Wilkes et al.(1996)]
		<ul style="list-style-type: none"> <li>• Epitope defined in the context of the Pediatric AIDS Foundation ARIEL project mother-infant HIV transmission study</li> </ul>			
gp120(42-52 PV22)	gp120(41-51)	VPVWKEATTTL	HIV-1 infection	human(B35)	[Cao et al.(1997)]
		<ul style="list-style-type: none"> <li>• VPVWKEATTTL is the consensus sequence for clades B and D</li> <li>• VPVWKDAETTL is the consensus sequence for clade A and it is cross-reactive</li> <li>• VPVWKEADTTL is the consensus sequence for clade C and it is cross-reactive</li> <li>• VPVWKEADTTL is the consensus sequence for clade E and even with three substitutions still retains some cross-reactivity</li> </ul>			
gp120(49-68)	gp120(41-60)	VPVWKEATTTLFCAS- DAKAY	HIV infection	human(unk)	[Lieberman et al.(1995)]
		<ul style="list-style-type: none"> <li>• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide</li> </ul>			
gp120(49-68 SF2)	gp120(41-60)	VPVWKEATTTLFCAS- DAKAY	HIV infection	human(unk)	[Lieberman et al.(1997)]
		<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• Three of these 11 had CTL response to this peptide</li> <li>• The responding subjects were HLA-A2, A3, B8, B62; HLA-A3, A24, B7, B38; and HLA-A2, A26, B7, B38</li> </ul>			
gp120(59-78)	gp120(51-70)	LFCASDAKAYDTEVH- INVWAT	HIV infection	human(unk)	[Lieberman et al.(1995)]
		<ul style="list-style-type: none"> <li>• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide</li> </ul>			
gp120(59-78 SF2)	gp120(51-70)	LFCASDAKAYDTEVH- INVWAT	HIV infection	human(unk)	[Lieberman et al.(1997)]
		<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> <li>• The responding subject was HLA-A2 and B-21</li> </ul>			
gp120(59-68 HXB2)	gp120(51-60)	LFCASDAKAY	HIV-1 infection	human(unk)	[Lieberman et al.(1992)]
		<ul style="list-style-type: none"> <li>• CTL epitope defined by T cell line and peptide mapping</li> </ul>			

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(53-62 LAI)	gp120(51-60)	LFCASCAKAY	HIV-1 infection	human(B38)	[Shankar et al.(1996)]
		<ul style="list-style-type: none"> <li>• Uncertain whether optimal, binds A24 as well</li> </ul>			
gp120(69-88 SF2)	gp120(61-79)	DTEVHNVWATHACVP-TDPN	HIV-1 infection	human(unk)	[Lieberman et al.(1997)]
		<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> <li>• The responding subject was HLA-A2 and B-21</li> </ul>			
gp120(77-85 SF2)	gp120(77-85)	DPNPQEVVL	HIV-1 infection	human(B35,B51)	[Shiga et al.(1996)]
		<ul style="list-style-type: none"> <li>• Binds HLA-B*3501 and B*5101 – binds and kills gp120-vaccinia virus infected cells carrying B35 or B51</li> </ul>			
gp120(77-85 SF2)	gp120(77-85)	DPNPQEVVL	HIV-1 infection	human(B*3501)	[Tomiyama et al.(1997)]
		<ul style="list-style-type: none"> <li>• A CTL clone responsive to this epitope was obtained</li> <li>• 2/7 B35 positive individuals have a CTL response to this epitope</li> <li>• This epitope is highly variable</li> <li>• The substitutions: 1N, 3S and 7I, 7L and 9M, 8I, 8K all abrogate specific CTL lysis, while only 8K reduces binding to B*3501</li> <li>• The substitution 8V to 8E does not reduce specific CTL activity</li> </ul>			
gp120(111-126 IIIB)	gp120(103-118)	MQEDIISLWDQSLKPC	primary <i>in vitro</i> response to peptide	human(unk)	[Macatonia et al.(1991)]
		<ul style="list-style-type: none"> <li>• Primary CTL response with cells from non-infected donors stimulated by the peptide</li> </ul>			
gp120(112-124 IIIB)	gp120(104-116)	HEDIISLWDQSLK	HIV-1 infection	human(A2)	[Clerici et al.(1991)]
		<ul style="list-style-type: none"> <li>• Helper and cytotoxic T cells can be stimulated by this peptide (T2)</li> </ul>			
gp120(MN)	gp120(104-116)	HEDIISLWDQSLK	HIV-1 infection	chimpanzee(unk)	[Lubeck et al.(1997)]
		<ul style="list-style-type: none"> <li>• No epitope-specific CTL were detected in chimpanzees immunized with adenovirus-HIV-1 MN gp160 recombinant despite a response to peptides P18 and T1</li> <li>• Helper and cytotoxic T cells have been found to be stimulated by this peptide (T2)</li> </ul>			

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gp120(112-124 IIIB)	gp120(104-116)	HEDIISLWDQSLK	HIV exposure	human(unk)	[Pinto et al.(1995)]
		<ul style="list-style-type: none"> <li>• CTL and T helper cell reactivity in healthcare workers exposed to HIV</li> </ul>			
gp120(119-139 SF2)	gp120(111-129)	WDQSLKPCVKLTPLC-VSLK	HIV-1 infection	human(unk)	[Lieberman et al.(1997)]
		<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> <li>• The responding subject was HLA-A2 and B-21</li> </ul>			
gp120(120-128 LAI)	gp120(120-128)	KTLPLCVTL	MN rec gp160	human(A2)	[Dupuis et al.(1995)]
		<ul style="list-style-type: none"> <li>• CTL from HLA-A2 positive subject react with this peptide; peptide binds to HLA-A*0201</li> </ul>			
gp120(156-165 IIIB)	gp120(160-169)	NCSFNISTSI	HIV-1 infection	human(Cw8)	[Sipsas et al.(1997)]
		<ul style="list-style-type: none"> <li>• HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 lab workers accidentally infected with HIV-1 IIIB</li> <li>• NCSFNITSI, a variant found in HIV-1 MN, was not recognized, thus this epitope was type-specific</li> <li>• NCSFNISTSI contains two potential N-linked glycosylation sites and cysteine residue, possibly related to the requirement for a high sensitizing dose of peptide for CTL activity</li> </ul>			
gp120(193-212 BRU)	gp120(192-211)	TTSYTLTSCNTSVIT-QACPK	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
		<ul style="list-style-type: none"> <li>• Defined through blocking CTL activity, and Env deletions</li> </ul>			
gp120(199-219 SF2)	gp120(196-215)	SLTSCNTSVITQACP-KVSFE	HIV-1 infection	human(unk)	[Lieberman et al.(1997)]
		<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> <li>• The responding subject was HLA-A2, -B21</li> </ul>			
gp120(192-199 HXB2R)	gp120(196-204)	KLTSCNTSV	HIV-1 infection	human(A2)	[Brander et al.(1995a)]
		<ul style="list-style-type: none"> <li>• Epitope predicted on HLA binding motif, and studied in the context of inclusion in a synthetic vaccine</li> </ul>			

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gp120(197-205)	gp120(196-204)	TLTSCNTSV	no CTL shown	human(A2)	[Garboczi et al.(1992)]
	<ul style="list-style-type: none"> <li>• Crystallization of HLA-A2 molecules complexed with antigenic peptides – refers to Dadaglio et al 1991</li> </ul>				
gp120(199-207)	gp120(196-204)	TLTSCNTSV	peptide immunization and HIV-1 infection	human(A2.1)	[Brander et al.(1996)]
	<ul style="list-style-type: none"> <li>• This epitope was recognized by PBMC from 6/14 HIV+ asymptomatic patients</li> <li>• This epitope was used along with pol CTL epitope ALQDSGLEV and a tetanus toxin T helper epitope for a synthetic vaccine</li> <li>• This vaccine failed to induce a CTL response, although a helper response was evident</li> </ul>				
gp120(201-225 LAI)	gp120(205-229)	ITQACPKVSFEPIPH-YCAPAGFAI	gp160 vacc vaccine	human(CD4+ CTL)	[Johnson et al.(1994b), Johnson et al.(1994a)]
	<ul style="list-style-type: none"> <li>• CD4+ CTL isolated from LAI IIIB gp160 vaccinees</li> </ul>				
gp120(209-228)	gp120(206-225)	TQACPKVSFEPIPH-YCAPA	HIV infection	human(tunk)	[Lieberman et al.(1995)]
	<ul style="list-style-type: none"> <li>• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide</li> </ul>				
gp120(209-228 SF2)	gp120(206-225)	TQACPKVSFEPIPH-YCAPA	HIV infection	human(tunk)	[Lieberman et al.(1997)]
	<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> </ul>				
gp120(219-238 HXB2)	gp120(216-235)	PIPIHYCAPAGFAIL-KCNNK	HIV-1 infection	human(tunk)	[Lieberman et al.(1992)]
	<ul style="list-style-type: none"> <li>• CTL epitope defined by T cell line and peptide mapping</li> </ul>				
gp120(219-238)	gp120(216-235)	PIPIHYCAPAGFAIL-KCNNK	HIV infection	human(tunk)	[Lieberman et al.(1995)]
	<ul style="list-style-type: none"> <li>• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide</li> </ul>				

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gp120(241-249 LAI)	gp120(243-251)	CTNVSTVQC	HIV-1 infection	human(Cw8)	[Sipsas et al.(1997)]
	<ul style="list-style-type: none"> <li>• HIV IIIB proteins were used to define the range of CTL epitopes recognized by 3 lab workers accidentally infected with HIV-1 IIIB</li> <li>• CTNVSTVQC contains a potential N-linked glycosylation site and cysteine residues, possibly related to a requirement for a high sensitizing dose of peptide for CTL activity</li> </ul>				
gp120(249-268)	gp120(246-265)	VSTVQCTHGIRPVVS-TQLLL	HIV infection	human(unk)	[Lieberman et al.(1995)]
	<ul style="list-style-type: none"> <li>• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide</li> </ul>				
gp120(249-268 SF2)	gp120(246-265)	VSTVQCTHGIRPVVS-TQLLL	HIV infection	human(unk)	[Lieberman et al.(1997)]
	<ul style="list-style-type: none"> <li>• Of 25 patients, most had CTL specific for more than 1 HIV-1 protein</li> <li>• 11 subjects had CTL that could lyse vaccinia expressed LAI gp160</li> <li>• One of these 11 had CTL response to this peptide</li> <li>• The responding subject was HLA-2, -B21</li> </ul>				
gp120(256-275 LAI)	gp120(256-275)	RPVSTQLLNGSLA-EEEEV	HIV-1 infection	human(B7)	[Shankar et al.(1996)]
gp120(255-263 SF2)	gp120(256-264)	RPVSTQLL	HIV-1 infection	human(B35)	[Shiga et al.(1996)]
	<ul style="list-style-type: none"> <li>• Binds HLA-B*3501</li> </ul>				
gp120(255-263 SF2)	gp120(256-264)	RPVSTQLL	HIV-1 infection	human(B*3501)	[Tomiya et al.(1997)]
	<ul style="list-style-type: none"> <li>• A CTL clone responsive to this epitope was obtained</li> <li>• Only 1/7 B35 positive individuals had a CTL response to this epitope</li> <li>• An I to V substitution at position 3 reduces specific lysis, but not binding to B*3501</li> <li>• A Q to H substitution at position 7 abrogates specific lysis, but not binding to B*3501</li> </ul>				

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gp120(295-312 BRU)	gp120(295-311)	SVEINC <sup>SI</sup> TRPNNNTRK-	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
		<ul style="list-style-type: none"> <li>Defined through blocking CTL activity, and Env deletions</li> </ul>			
gp120(302-312 HXB2)	gp120(302-311)	RPNNNTRKSI	HIV-1 infection	human(B7)	[Safrit et al.(1994b)]
		<ul style="list-style-type: none"> <li>CTL from two acute seroconversion cases</li> </ul>			
gp120(302-312 HXB2)	gp120(302-311)	RPNNNTRKSI	HIV-1 infection	human(B7)	[Hammond et al.(1995)]
		<ul style="list-style-type: none"> <li>Peptide processed by a TAP-1/2-dependent pathway only</li> <li>CTL from an acute seroconverter</li> </ul>			
gp120(302-312 HXB2)	gp120(302-311)	RPNNNTRKSI	HIV infection	human(B7)	[Wolinsky et al.(1996)]
		<ul style="list-style-type: none"> <li>Longitudinal study of epitope variation <i>in vivo</i></li> </ul>			
gp120(303-312 IIIB)	gp120(302-311)	RPNNNTRKSI	HIV-1 infection	human(?B7)	[Wilkes et al.(1996)]
		<ul style="list-style-type: none"> <li>Epitope defined in the context of the Pediatric AIDS Foundation ARIEL transmission study</li> <li>RPNNNTRKDI and RPNNNTRKGI, naturally occurring variants, were found in non-transmitting mother – ability to recognize these variants has not yet been determined</li> </ul>			
gp120(V3 loop HXB2)	gp120(310-324)	RIQRGPGRA <sup>SI</sup> FVTIGK	gag-V3 fusion	murine(H-2 <sup>d</sup> )	[Griffiths et al.(1993)]
		<ul style="list-style-type: none"> <li>Gag-V3 fusion protein immunization elicited V3 CTL response in mice</li> </ul>			
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRA <sup>SI</sup> FVTIGK	Intranasal peptide with cholera toxin as a mucosal adjuvant	murine(H-2D <sup>d</sup> )	[Porgador et al.(1997)]
		<ul style="list-style-type: none"> <li>IIIB peptide referred to as R15K</li> <li>Peptide-specific CTLs were induced after <i>in vitro</i> restimulation with peptide-pulsed targets</li> <li>R15K was superior at inducing CTL compared to the RGPGR<sup>SI</sup>FVTI, in contrast to the findings of Nehete <i>et al.</i></li> <li>Memory CTL responses were induced</li> </ul>			

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gp120(V3 loop many strains)	gp120(310-324)	RIHIGPGRAFYTTKN	V3 loop peptides	murine(H-2D <sup>d</sup> )	[C'asement et al.(1995)]
	• V3 peptides from MN and SC induce murine CTL that are cross-reactive with diverse strains				
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	MN rgp120 with QS-21 adjuvant	murine(H-2D <sup>d</sup> )	[Newman et al.(1997)]
	• MN vaccine induced CTL reactive with MN, IIBB and RF vaccinia expressed Env, but not this peptide				
gp120(315-329 IIBB)	gp120(310-324)	RIQIRGPGRAFYTTGK	IIBB rgp120 with QS-21 adjuvant	murine(H-2D <sup>d</sup> )	[Newman et al.(1997)]
	• IIBB vaccine induced IIBB type-specific CTL to this peptide (P18), and an additional Env CTL response that was cross-reactive				
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFYTTKN	peptide vaccine	murine BALB/c (H-2 <sup>d</sup> )	[Ahlers et al.(1997b), Ahlers et al.(1997a)]
	• Vaccine constructs containing helper, antibody and CTL peptide epitopes induce a strong Th1, CTL and NAb responses against the autologous HIV-1 virus				
	• The peptide CTL response was as cross-reactive as one elicited by a vaccinia construct expressing rgp160 MN				
	• GM-CSF and IL-12 were the two cytokines most effective for inducing and boosting CTLs				
gp120(MN)	gp120(310-324)	RIHIGPGRAFYTTKN	HIV-1 infection	chimpanzee(unk)	[Lubeck et al.(1997)]
	• Epitope-specific CTL detected in chimpanzees immunized with adenovirus-HIV-1 MN gp160 recombinant				
	• CTL response may account for protection against subsequent HIV-1 SF2 challenge in a chimpanzee lacking neutralizing antibodies				
gp120(V3 loop MN)	gp120(313-322)	IGPGRAFYTT	<i>B. abortus</i> -peptide conjugate	murine(H-2D <sup>d</sup> )	[Lapham et al.(1996)]
	• <i>B. abortus</i> -peptide conjugate induced a virus-specific CTL response in CD4+ lymphocyte depleted mice				

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gp120(315-329) IIIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	HIV exposure	human(unk)	[Pinto et al.(1995)]
	• CTL and T helper cell reactivity in healthcare workers exposed to HIV				
gp120(315-329)	gp120(310-324)	RIQRGPGRAFVTIGK	vaccinia IIIB gp160	murine(H-2D <sup>d</sup> )	[Takahashi et al.(1988)]
	• V3 loop CTL response in mice vaccinated with gp160				
gp120(315-329) IIIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	IIIB peptide	murine(D <sup>d</sup> )	[Takahashi et al.(1989a)]
	• R(8) F(10) MHC/peptide interaction; V(11) T cell receptor binding				
gp120(315-329) IIIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	IIIB peptide	murine(D <sup>d</sup> )	[Sastry et al.(1992)]
	• Free peptide injected into the footpad of a mouse could stimulate specific CTL				
gp160(318-327) IIIIB	gp120(313-322)	RGPGRAFVTI	IIIB peptide	murine(D <sup>d</sup> )	[Takahashi et al.(1993)]
	• Successful priming with vaccination of peptide pulsed splenic dendritic cells				
gp160(318-327) 18IIIIB	gp120(313-322)	RGPGRAFVTI	IIIB peptide	murine(D <sup>d</sup> )	[Takahashi et al.(1996)]
	• Exposure of CD8+ CTL to free peptide corresponding to the epitope results in strong inhibition of the CTL response to targets presented with the same peptide				
	• The authors propose this is due to a "self-veto", where the CTL is inactivated by a CD8+ cell carrying the appropriate peptide-MHC complex				
gp160(318-327) 18IIIIB	gp120(313-322)	RGPGRAFVTI	A rapidly degraded form of Env	murine(L <sup>d</sup> )	[Tobery & Siliciano(1997)]
	• An HIV-1 Env vaccine was targeted for rapid cytoplasmic degradation				
	• The rapidly degraded form rapidly stimulated CTL to this peptide, faster than the normal vaccinia-env				
	• The rapidly degraded form also stimulated greater specific CTL lysis and higher CTLp frequencies than normal Env				
	• Similar results were obtained for a Nef protein designed for rapid degradation				

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gp160(318-327) 18IIIB	gp120(313-322)	RGPGRAFVTI	Combination peptide vaccine	murine BALB/c (H-2 <sup>d</sup> )	[Hamajima et al.(1997)]
		<ul style="list-style-type: none"> <li>• B cell epitope HGP-30 also serves as a CTL epitope</li> <li>• Vaccine combined HGP-30, V3 loop peptide variants, and CD4 binding site peptide</li> <li>• IL-12 expression plasmid included with the vaccination enhanced the CTL response</li> </ul>			
gp160(318-327) 18IIIB	gp120(313-322)	RGPGRAFVTI	IIIB peptide	murine(D)	[Nehete et al.(1995)]
		<ul style="list-style-type: none"> <li>• RGPGRAFVTI was defined as the optimal peptide for vaccination, out of RIQRGPGRAFVTIGK</li> <li>• This peptide, in a carrier-free form in Freund's adjuvant, could stimulate Env specific CTL in BALB/c mice</li> </ul>			
gp120(V3 loop SF2)	gp120(313-321)	IGPGRAFHT	gp120(SF2) DNA vaccine, rgp120 protein boost	murine(H-2D <sup>d</sup> )	[Barnett et al.(1997)]
		<ul style="list-style-type: none"> <li>• CTL were induced by vaccine, and restimulated <i>in vitro</i> with V3 peptide</li> <li>• DNA vaccine with protein boost stimulated both CTL and antibodies</li> <li>• Strains SF2 (IGPGRAFHT), US4 (IGPGRAFYA), and CM235 (IGPGQVFYR) were tested</li> </ul>			
gp160(318-327) IIIIB	gp120(313-322)	RGPGRAFVTI	CTL line from HIV-donor	human(A2.1)	[Alexander-Miller et al.(1996)]
		<ul style="list-style-type: none"> <li>• This immunogenic peptide does not have the known binding motif for A2.1</li> <li>• The same optimal peptide for this human HLA-A2.1 epitope was observed for a murine H-2 D<sup>d</sup> epitope</li> </ul>			
gp120(V3 loop MN)	gp120(313-322)	IGPGRAFYTT	<i>B. abortus</i> -peptide conjugate	murine(H-2D <sup>d</sup> )	[Lapham et al.(1996)]
		<ul style="list-style-type: none"> <li>• <i>B. abortus</i>-peptide conjugate induced a virus-specific CTL response in CD4+ lymphocyte depleted mice</li> </ul>			

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gp160(318-327) IIIB	gp120(313-322)	RGPGRAFVTTI <ul style="list-style-type: none"> <li>• XGPXRXXXXI are critical for binding, consistent with H-2Dd motif XGPX(RKH)XXX(X)(LIF)</li> </ul>	peptide	murine(H-2D <sup>d</sup> )	[Takeshita et al.(1995)]
gp120(315-329) BRU)	gp120(310-324)	RIQRPGRGFVTTIGK <ul style="list-style-type: none"> <li>• Defined through blocking CTL activity, and Env deletions</li> </ul>	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
gp120(315-329) IIIB)	gp120(310-324)	RIQRPGRGFVTTIGK <ul style="list-style-type: none"> <li>• Helper and cytotoxic T cells can be stimulated by this peptide (P18)</li> </ul>	HIV-1 infection	human(A2)	[Clerici et al.(1991)]
gp120(315-329) IIIB)	gp120(310-324)	RIQRPGRGFVTTIGK <ul style="list-style-type: none"> <li>• PCLUS 3-18MN synthetic peptide vaccine construct contained T1 helper epitope covalently linked to truncated P18 CTL epitope</li> <li>• A substitution in the T1 peptide stimulated an enhanced Th response and class II binding specificity, which in turn enhanced CTL induction by vaccine</li> <li>• Construct PCLUS 3-18MN is currently in a phase I vaccine clinical trial</li> </ul>	peptide immunization	murine(D <sup>d</sup> )	[Ablers et al.(1997c)]
gp120(312-320) SF2)	gp120(313-321)	IGPGRAFHT <ul style="list-style-type: none"> <li>• Murine CTL response to peptide observed after immunization with DNA plasmid containing HIV-1 (SF2) gp120 gene regulated by bacteriophage T7 promoter</li> <li>• CTL response required coadministration of rec vaccinia virus expressing T7 RNA polymerase or T7 RNA polymerase soluble protein</li> </ul>	DNA gp120-plasmid immunization	murine(D <sup>d</sup> )	[Selby et al.(1997)]
gp160(318-327) IIIB)	gp120(313-322)	RGPGRAFVTTI <ul style="list-style-type: none"> <li>• Individual was immunized with rec vaccinia gp160 IIIB and boosted with purified gp160</li> <li>• Lysis only occurs with IIIB P18 peptide pulsed onto autologous targets, MN, RF, SIMI P18 peptides fail to stimulate CTL</li> <li>• Restimulating immune cells from gp160 IIIB vaccinees with MN, RF, or SIMI P18 did not enhance the MN, RF, or SIMI specific CTL response</li> </ul>	vaccinia IIIB gp160	human(A2)	[Achour et al.(1996)]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp160(318-327 SIMI)	gp120(313-322)	MGPKRAFYAT	vaccinia SIMI gp160	human(A2)	[Achour et al.(1996)]
	<ul style="list-style-type: none"> <li>Individual was immunized with rec vaccinia gp160 SIMI and boosted with purified recombinant gp160 SIMI</li> <li>P18 MN and RF peptides were able to stimulate the HIV specific CTL that arose in response to the SIMI vaccination, thus the P18 MN peptide (IGPGRAFYTT) and the P18 RF peptide (KGPGRVIYAT) could cross-react</li> <li>The P18 IIIB peptide does not cross-react (RGPGRAFVTI in the epitope region)</li> <li>gp160 SIMI primed immune cells could generate a significantly broader specificity when stimulated with P18 MN or P18RF peptides, but not P18 IIIB</li> </ul>				
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFTIGK	vaccinia IIIB gp160	murine(H-2 <sup>d,p,u,q</sup> )	[Shirai et al.(1992), Shirai et al.(1993)]
	<ul style="list-style-type: none"> <li>In a murine system multiple class I molecules can present this peptide, called P18, to CTL, including H-2D<sup>d</sup>, H-2D<sup>p</sup>, H-2D<sup>q</sup>, H-2L<sup>q</sup></li> <li>The MHC class I molecule D<sup>d</sup> as well as H-2<sup>u,p,q</sup>, were found to present peptides P18 and HP53</li> <li>The V-β usage in T cells showing cross-reaction between these two peptides was conserved for H-2<sup>d,u,p</sup>, but not in H-2<sup>q</sup></li> </ul>				
gp120(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	vaccinia IIIB gp160	murine(H-2 <sup>d,p,u</sup> )	[Shirai et al.(1997)]
	<ul style="list-style-type: none"> <li>Three class I MHC, H-2<sup>d,p,u</sup>, that differ in sequence and serology, cross-present this peptide to T-cells of each of the other haplotypes</li> <li>The amino acids R, F, and I are each critical for strong CTL activity with all three MHC molecules</li> </ul>				
gp120(318-327 IIIB)	gp120(313-322)	RGPGRAFVTI	rec vaccinia-gp160	murine(H-2 <sup>d</sup> )	[Goletz et al.(1997)]
	<ul style="list-style-type: none"> <li>Anthrax lethal toxin can deliver proteins to the cytosol of eukaryotic cells</li> <li>A fusion protein linking the delivery domain of the anthrax protein to gp120 achieved cellular uptake, and gp120 was processed allowing presentation of this V3 epitope to CTL <i>in vitro</i></li> </ul>				
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFTIGK	rec vaccinia gp160	murine(H-2D <sup>d,p,q</sup> , H-2 <sup>u</sup> )	[Shirai et al.(1996)]
	<ul style="list-style-type: none"> <li>Multiple murine MHC can cross-present this epitope (P18) and HP53, DRVIEVVQGYRAIR, to specific CTL</li> </ul>				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	V3:Ty-Virus-like particles	murine(H-2 <sup>d</sup> )	[Layton et al.(1993)]
	<ul style="list-style-type: none"> <li>• V3-Ty-Virus-like particles can induce type-specific CTL in mice in the absence of adjuvant</li> </ul>				
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	vaccinia IIIB gp160	human(A11)	[Achour et al.(1994)]
	<ul style="list-style-type: none"> <li>• One of 3 HLA type restrictions associated with this peptide</li> </ul>				
gp120(315-329 IIIB)	gp120(310-324)	RIQRGPGRAFVTIGK	gp160 vaccinia	human(A2,A3)	[Achour et al.(1993)]
	<ul style="list-style-type: none"> <li>• Two of 3 HLA type restrictions associated with this peptide</li> </ul>				
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFVTTKN	MN gp160 vaccinia	murine(D <sup>d</sup> )	[Takahashi et al.(1989b)]
	<ul style="list-style-type: none"> <li>• Y(11 MN) exchange with V(11 IIIB) interchanges specificities</li> </ul>				
gp120(313-327 MN)	gp120(310-324)	RIHIGPGRAFVTTKN	HIV exposure	human(unlk)	[Pinto et al.(1995)]
	<ul style="list-style-type: none"> <li>• CTL and T helper cell reactivity in healthcare workers exposed to HIV</li> </ul>				
gp120(313-327 IIIB, MN, RF)	gp120(310-324)	SITKGPGRVIYATGQ	RF gp160 vaccinia	murine(D <sup>d</sup> )	[Takahashi et al.(1992)]
	<ul style="list-style-type: none"> <li>• Comparison of MN, IIIB, and RF specificities, position 11 is critical</li> </ul>				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(314-322)	gp120(316-324)	GRAFVVTIGK	no CTL shown	human(B27)	[Jardetzky et al.(1991)]
		<ul style="list-style-type: none"> <li>• Study of peptide binding to HLA-B27; epitope examined in this context</li> </ul>			
gp120(337-368 LAI)	gp120(340-364)	KWNNTLKQIDSKLRE-QFGNNKTIIF	gp160 vacc vaccine	human(CD4+ CTL)	[Johnson et al.(1994a)]
		<ul style="list-style-type: none"> <li>• CD4+ CTL clones were obtained from an HIV-1 vaccinia-env vaccinee</li> </ul>			
gp120(339-361 LAI)	gp120(342-359)	NNTLKQIDSKLREQF-G	gp160 vaccinia	human(CD4+ CTL)	[Johnson et al.(1994b)]
		<ul style="list-style-type: none"> <li>• CD4+ CTL isolated from LAI IIIB gp160 vaccinees</li> </ul>			
gp120(374-380 BRU)	gp120(373-379)	PEIVTHS	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
		<ul style="list-style-type: none"> <li>• Defined through blocking CTL activity, and Env deletions</li> </ul>			
gp120(376-383 PV22)	gp120(379-387)	SFNCGGEFF	HIV-1 infection	human(Cw4)	[Johnson et al.(1993)]
		<ul style="list-style-type: none"> <li>• Conserved epitope; a G to R substitution, FNCRGEFF, abolished CTL recognition</li> </ul>			
gp120(376-383 PV22)	gp120(379-387)	SFNCGGEFF	CTL not shown	human(Cw4)	[Wolinsky et al.(1996)]
		<ul style="list-style-type: none"> <li>• Longitudinal study of epitope variation <i>in vivo</i></li> </ul>			
gp120(375-383 IIIB)	gp120(379-387)	SFNCGGEFF	HIV-1 infection	human(B15)	[Wilson et al.(1997)]
		<ul style="list-style-type: none"> <li>• This is the optimal peptide for two CTL clones that recognize this epitope in the context of two different HLA molecules, Cw4 and B15</li> <li>• Predominant form in proviral DNA of the individual with B15 restricted CTL was SFTCGGEFF and this was recognized</li> <li>• Recognition of a minor autologous variant (SFNCRGEFF) from the B15 donor was greatly reduced</li> </ul>			

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(375-383 IIIB)	gp120(379-387)	SFNCGGGEFF	HIV-1 infection	human(Cw4)	[Wilson et al.(1997)]
	<ul style="list-style-type: none"> <li>This is the optimal peptide for two CTL clones that recognize this epitope in the context of two different HLA molecules, Cw4 and B15</li> <li>Only one form (TFNCGGGEFF) was found in the Cw4 donor and this form reacted with the CTL line similarly to the IIIB peptide</li> </ul>				
gp120(376-384 IIIB)	gp120(380-388)	FNCGGGEFFY	HIV-1 infection	human(A29)	[Wilson et al.(1997)]
	<ul style="list-style-type: none"> <li>This is the optimal peptide for two CTL clones derived from two different donors</li> <li>FNCRGEFFY and FNCRGGFFY are major and minor autologous variants in one of the donors, and showed reduced or no stimulatory activity for CTL from the host</li> <li>The IIIB form and the form FNCAGEFFY were present in the other donor, and the CTL line had reduced activity with the FNCAGEFFY form relative to the index peptide</li> </ul>				
gp120(376-384 LAI)	gp120(380-388)	FNCGGGEFFY	HIV-1 infection	human(A29)	[Brander & Walker(1997a)]
	<ul style="list-style-type: none"> <li>C. Wilson, in press in J. Virol.</li> </ul>				
gp120(381-392 BRU)	gp120(380-391)	KNCGGGEFFYCNS	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
	<ul style="list-style-type: none"> <li>Defined through blocking CTL activity, and Env deletions</li> </ul>				
gp120(377-387)	gp120(381-391)	NSGGEFFYSNS	?	human(A2)	[Hickling et al.(1990)]
	<ul style="list-style-type: none"> <li>Peptides recognized by class I restricted CTL can bind to class II</li> </ul>				
gp120(421-440 LAI)	gp120(417-436)	LPCRRIKQFINMWQEV-GKAMY	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
	<ul style="list-style-type: none"> <li>Defined through blocking CTL activity, and Env deletions</li> </ul>				
gp120(410-429 H3DCG)	gp120(417-430)	LPCRRIKQFINMWQJE	HIV-1 infection	human(DR4 CD4+)	[Siliciano et al.(1988)]
	<ul style="list-style-type: none"> <li>CD4+ CTL restricted by class II HLA-DR4, targets primed by CD4 mediated uptake of gp120</li> </ul>				
gp120(428-443 IIIB)	gp120(422-437)	KQHINMWQEVGKAMY-A	vaccinia IIIIB gp160	murine(H-2 <sup>a,b,f</sup> )	[Shirai et al.(1992)]
	<ul style="list-style-type: none"> <li>In a murine system multiple class I molecules can present to CTL</li> </ul>				

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
gp120(428-443 IIIB)	gp120(422-437)	KQIINMWQEVGKAMY- A	HIV exposure	human(unk)	[Pinto et al.(1995)]
	<ul style="list-style-type: none"> <li>• CTL and T helper cell reactivity in healthcare workers exposed to HIV</li> </ul>				
gp120(MN)	gp120(422-437)	KQIINMWQEVGKAMY- A	HIV-1 infection	chimpanzee(unk)	[Lubeck et al.(1997)]
	<ul style="list-style-type: none"> <li>• Epitope-specific CTL detected in chimpanzees immunized with adenovirus-HIV-1 MN gp160 recombinant</li> <li>• CTL response may account for protection against subsequent HIV-1 SF2 challenge in a chimpanzee lacking neutralizing antibodies</li> <li>• Helper and cytotoxic T cells can be stimulated by this peptide (T1)</li> </ul>				
gp120(421-440 LAI)	gp120(422-436)	KQFINMWQEVGKAMY	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
	<ul style="list-style-type: none"> <li>• Defined through blocking CTL activity, and Env deletions</li> </ul>				
gp120(428-443 IIIB)	gp120(422-437)	KQIINMWQEVGKAMY- A	HIV-1 infection	human(A2)	[Clerici et al.(1991)]
	<ul style="list-style-type: none"> <li>• Helper and cytotoxic T cells can be stimulated by this peptide (T1)</li> </ul>				
gp120(428-443 IIIB)	gp120(422-437)	KQIINMWQEVGKAMY- A	HIV-1 infection	human(A2)	[Cease et al.(1987)]
	<ul style="list-style-type: none"> <li>• Helper and cytotoxic T cells can be stimulated by this peptide (T1)</li> </ul>				
gp120(431-440)	gp120(435-444)	MYAPPIGGGI	synthetic peptide	murine(H-2K <sup>d</sup> )	[Duarte et al.(1996)]
	<ul style="list-style-type: none"> <li>• Tolerization of CTL response with continued administration of soluble peptide</li> </ul>				
gp120(494-513 BRU)	gp120(491-510)	VKIEPLGVAPTAKR- RVVQR	HIV-1 infection	human(A2)	[Dadaglio et al.(1991)]
	<ul style="list-style-type: none"> <li>• Defined through blocking CTL activity, and Env deletions</li> </ul>				